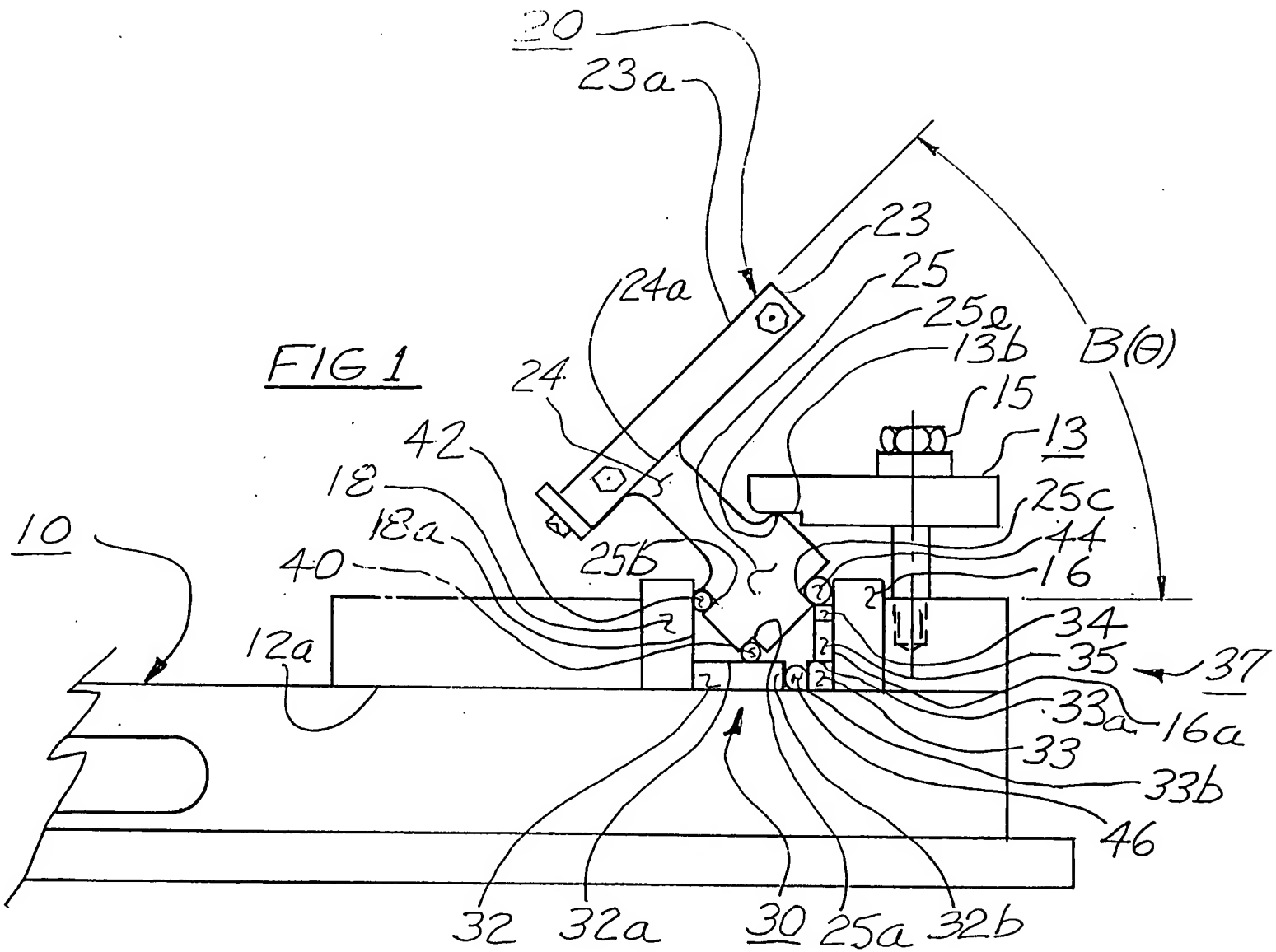

20
23a
23
25
25a
13b
B(θ)
24a
24
15
13
42
18
25c
18a
44
10
40
25b
16
34
12a
35
37
33a
16a
33
33b
46
32
32a
30
25a
32b

FIG 1

FIG 1a

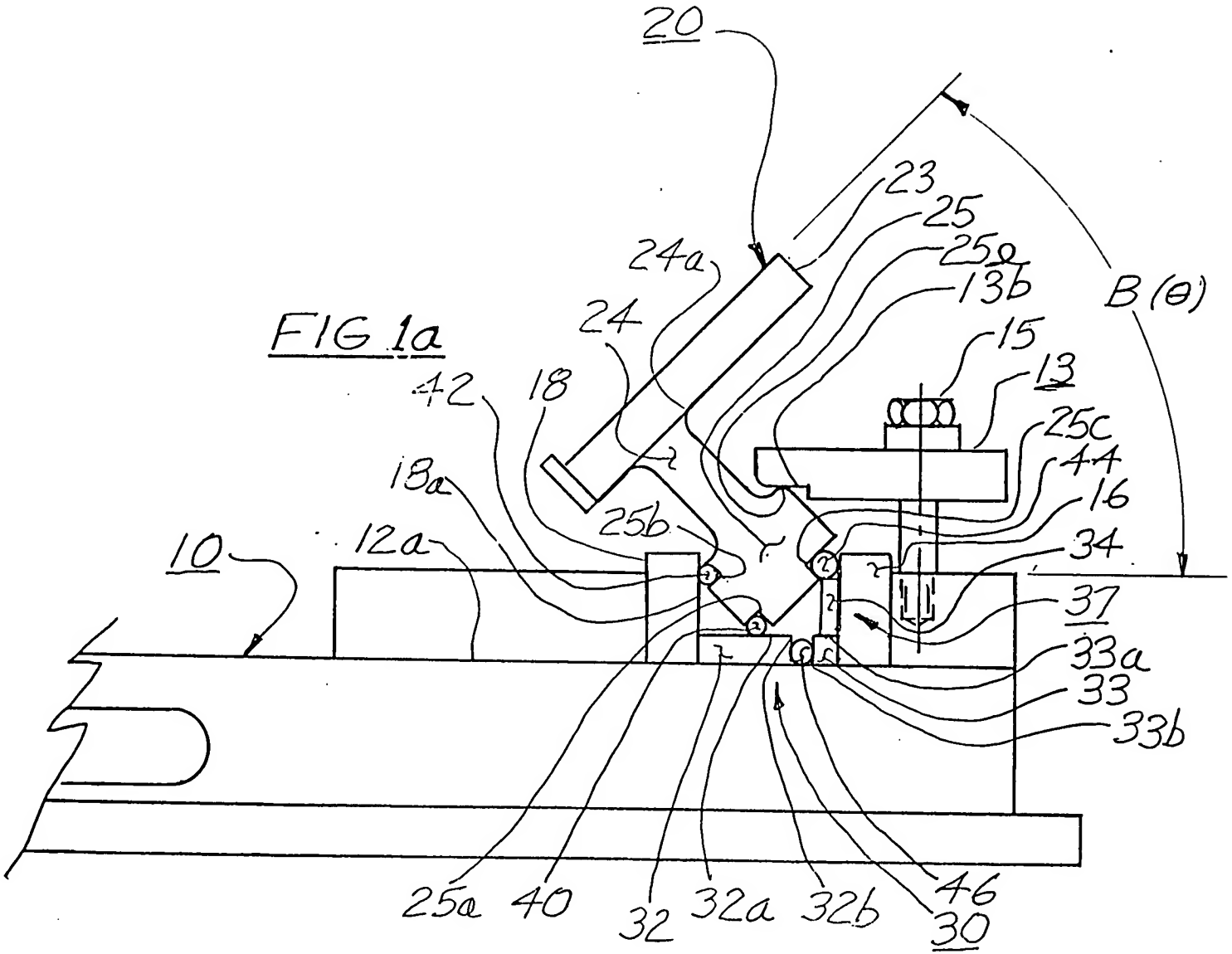
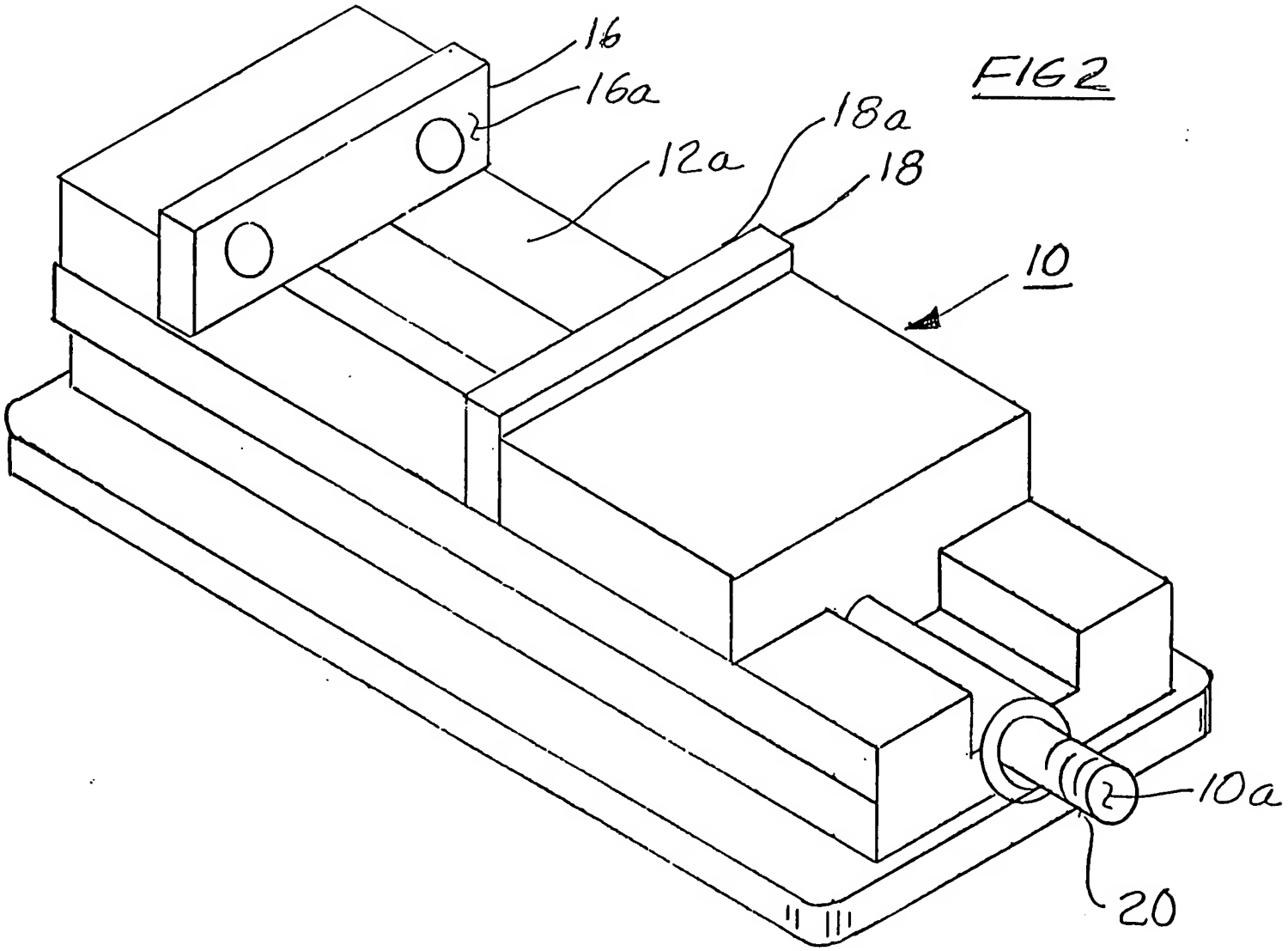

20
23
25
25a
13b
B (θ)
24a
24
15
13
42
18
25c
44
18a
16
25b
34
10
12a
37
33a
33
33b
25a
40
32
32a
32b
46
30

FIG 2



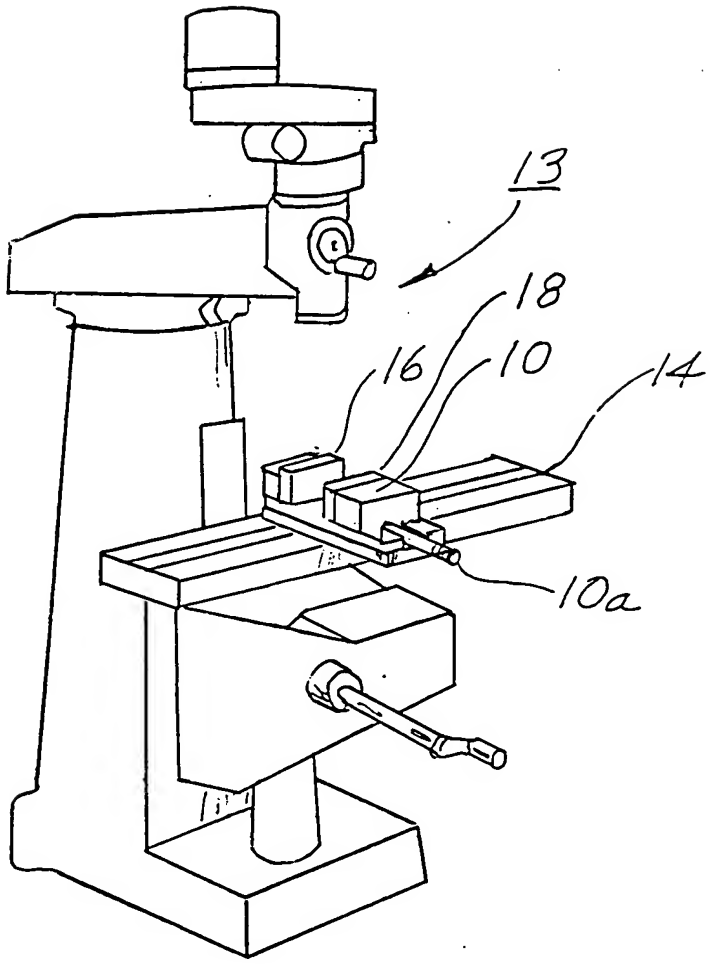


FIG 3

FIG 4

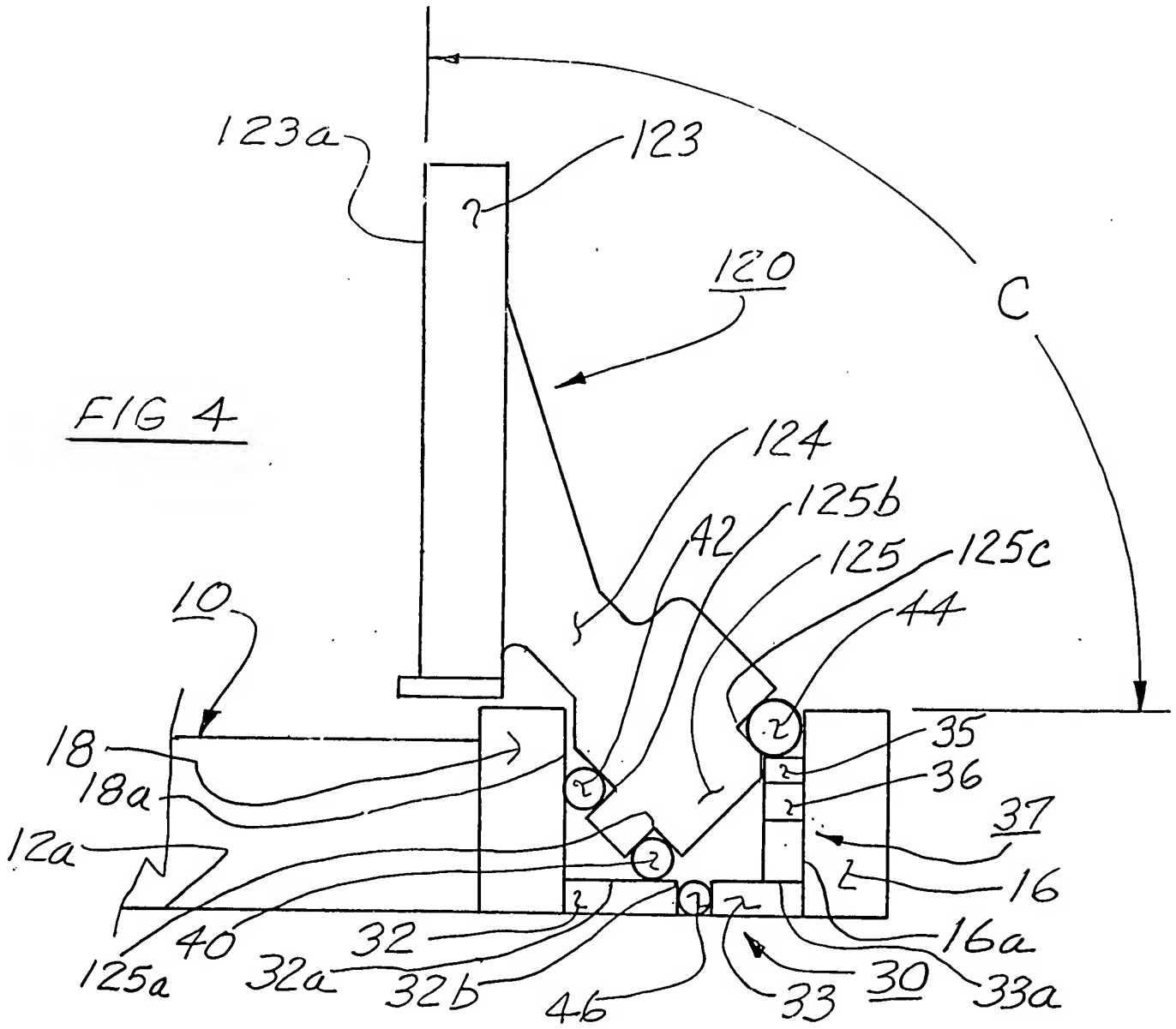

123a
123
120
C
124
125b
42
125
125c
44
10
18
18a
12a
35
36
37
16
16a
30
33a
33
46
32
32a
32b
40
125a

FIG 5

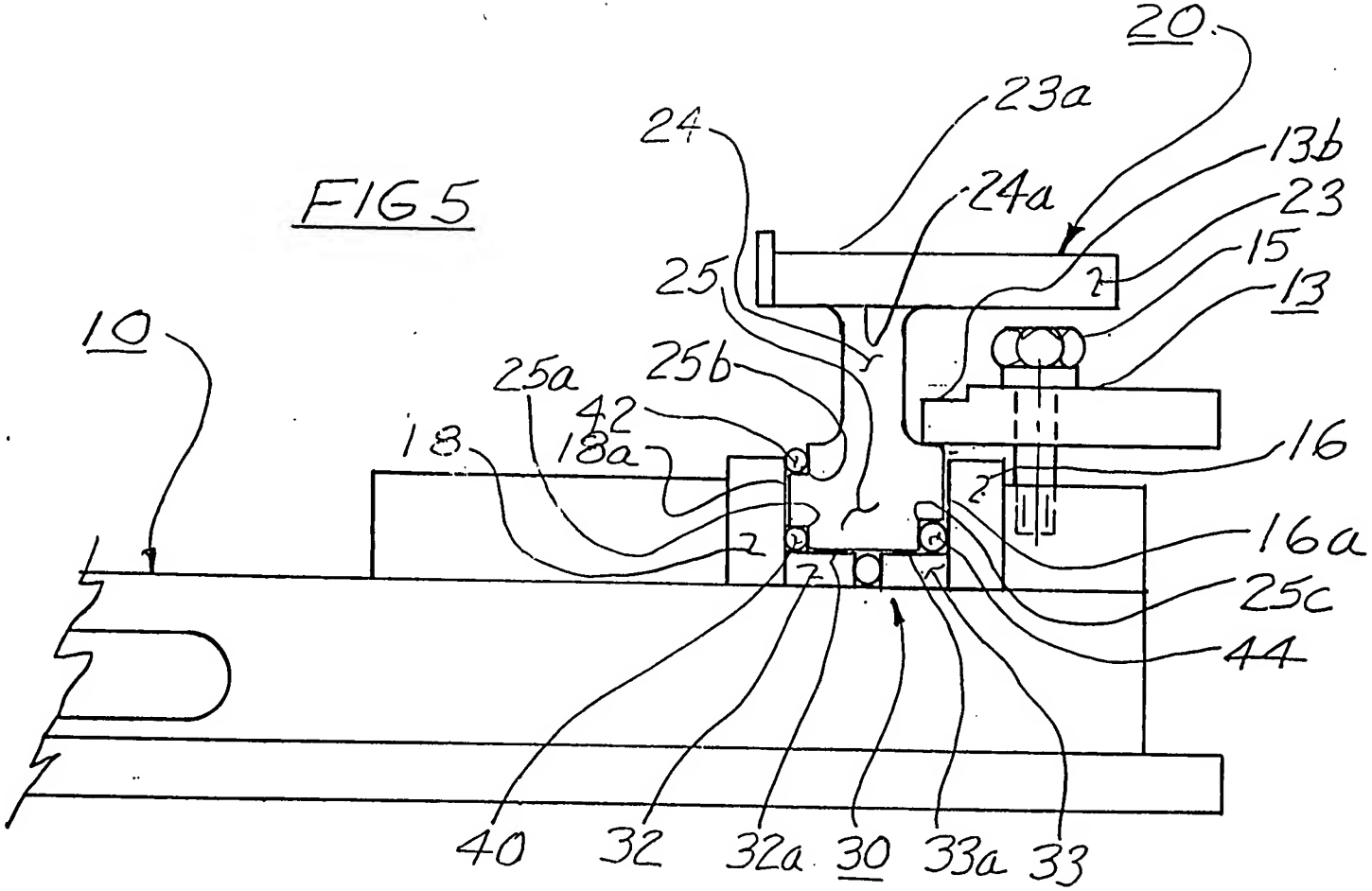

20
23a
24
13b
24a
23
25
15
13
10
25a
25b
42
18
18a
16
16a
25c
44
40
32
32a
30
33a
33

FIG 6b

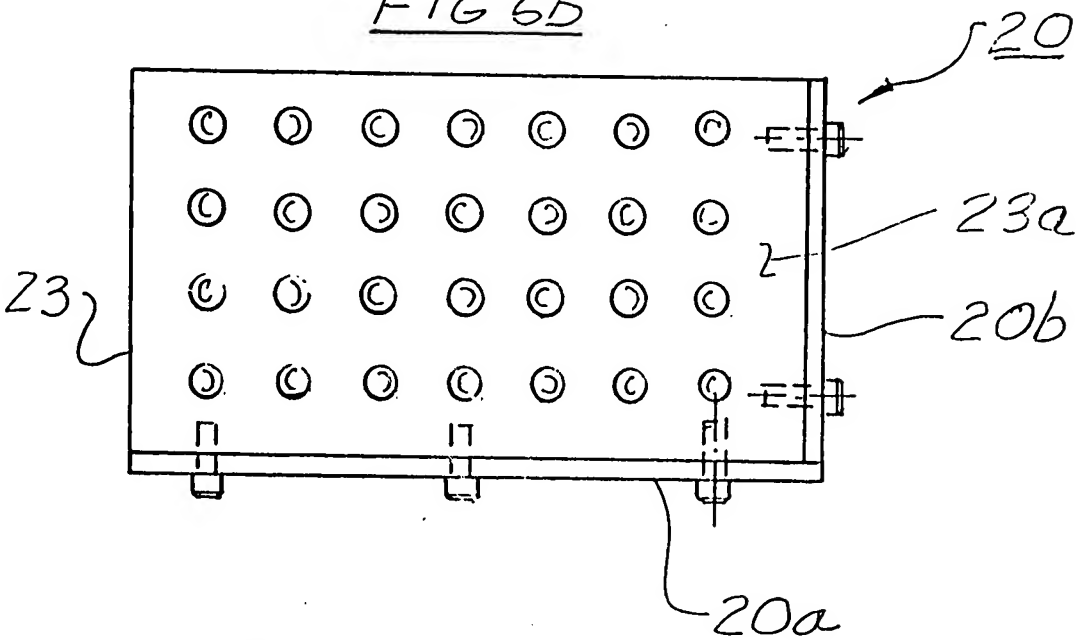


FIG 6a

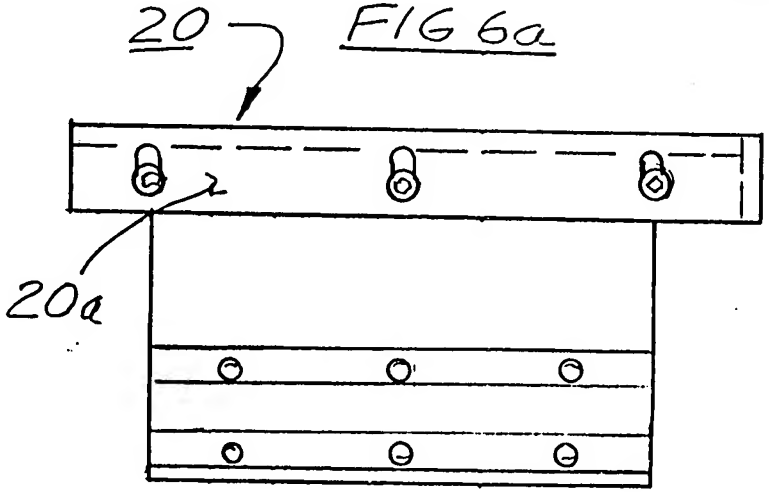


FIG6

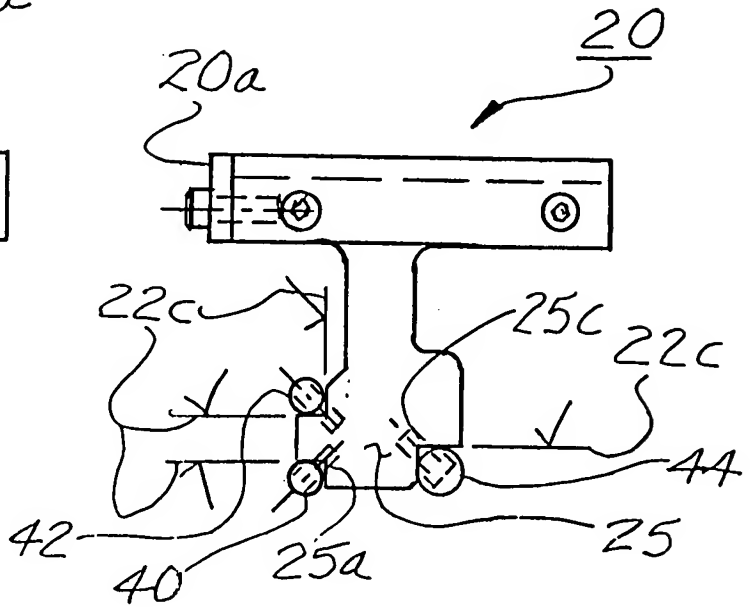


FIG 7b

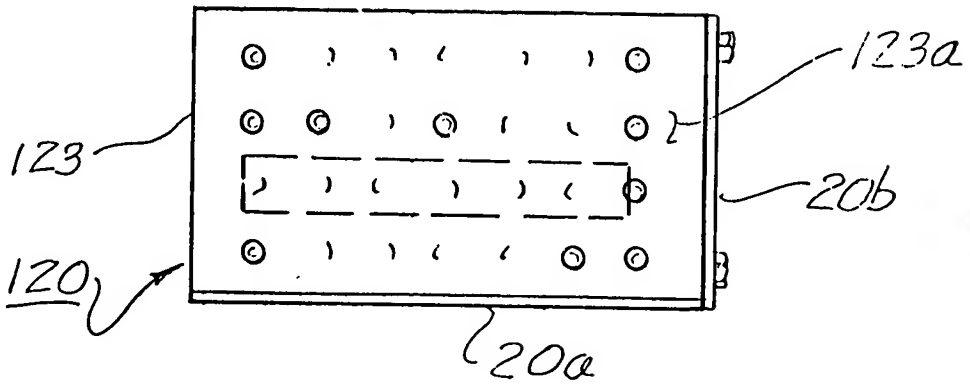


FIG 7

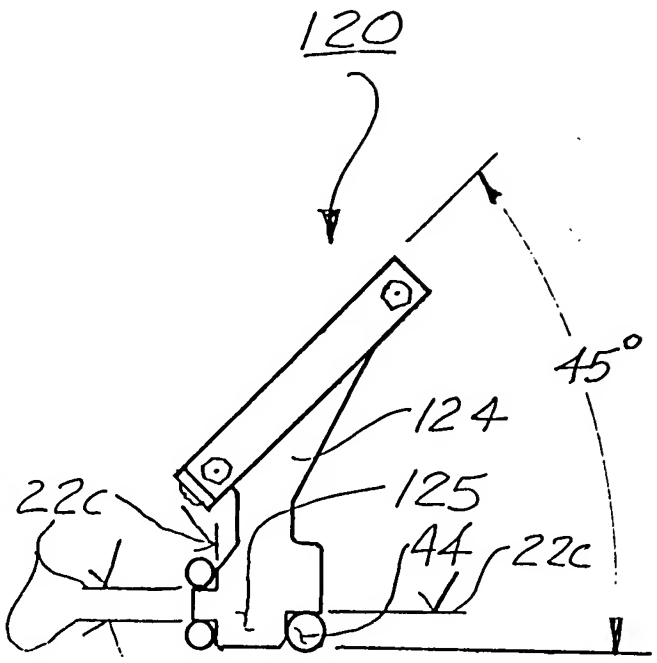


FIG 7a

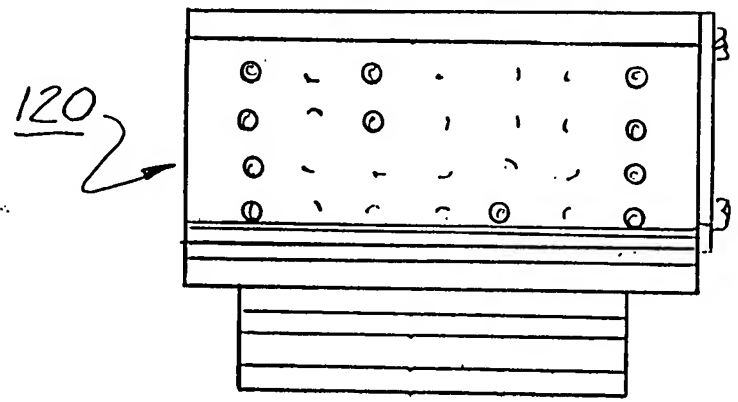


FIG 8

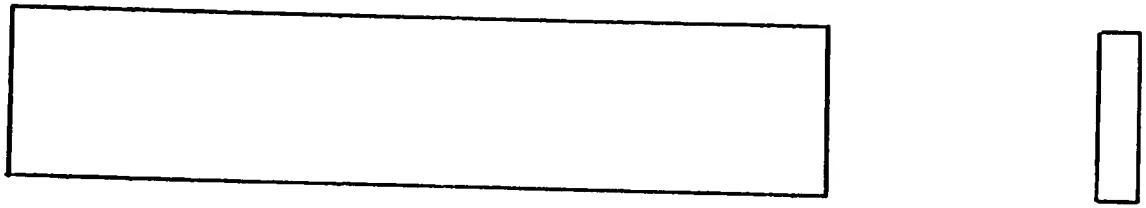
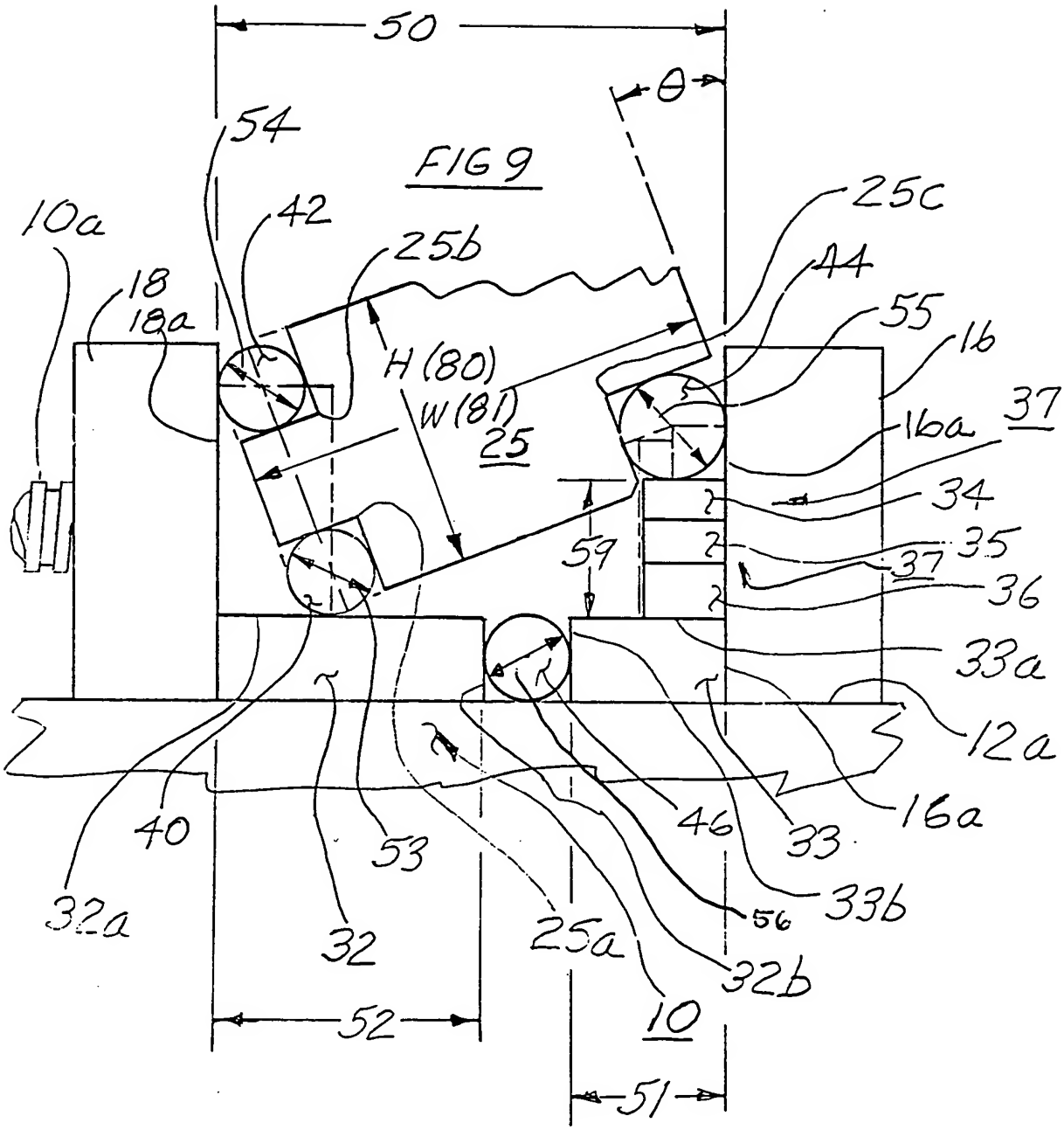
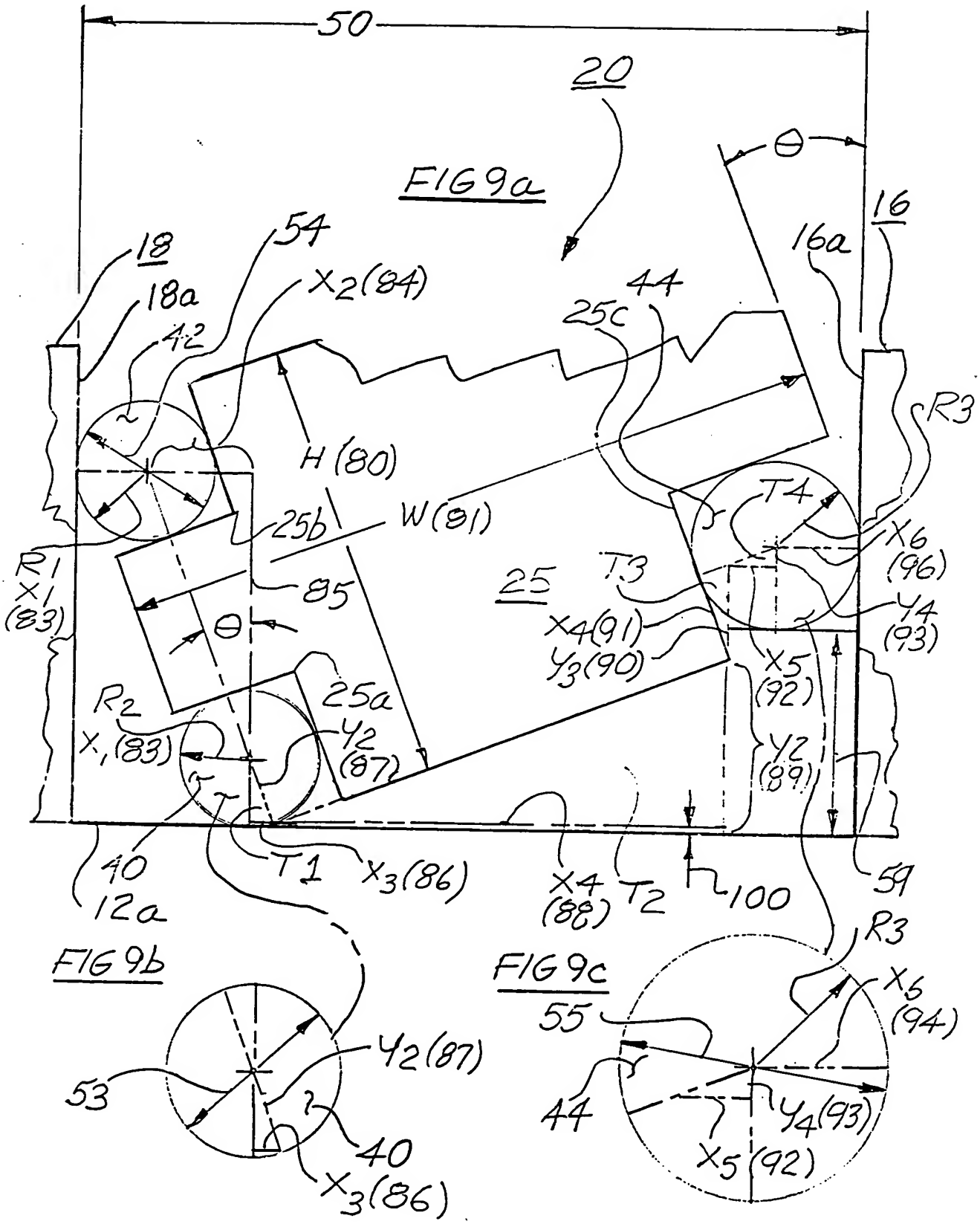


FIG 8a


50
θ
54
FIG 9
10a
42
25b
25c
44
18
18a
H (80)
W (81)
25
55
16
16a
37
34
35
37
36
59
33a
12a
40
53
46
33
16a
32a
32
25a
56
33b
32b
52
10
51


50
20
FIG 9a
16
16a
18
18a
54
X2(84)
44
25c
42
H(80)
W(81)
25b
R3
T4
X6
(96)
R1
X1
(83)
85
θ
25
T3
X4(91)
Y3(90)
Y4
(93)
X5
(92)
R2
X1(83)
25a
Y2
(87)
Y2
(89)
40
12a
T1
X3(86)
X4
(88)
T2
100
59
FIG 9b
FIG 9c
53
Y2(87)
40
X3(86)
55
R3
X6
(94)
44
Y4(93)
X5(92)

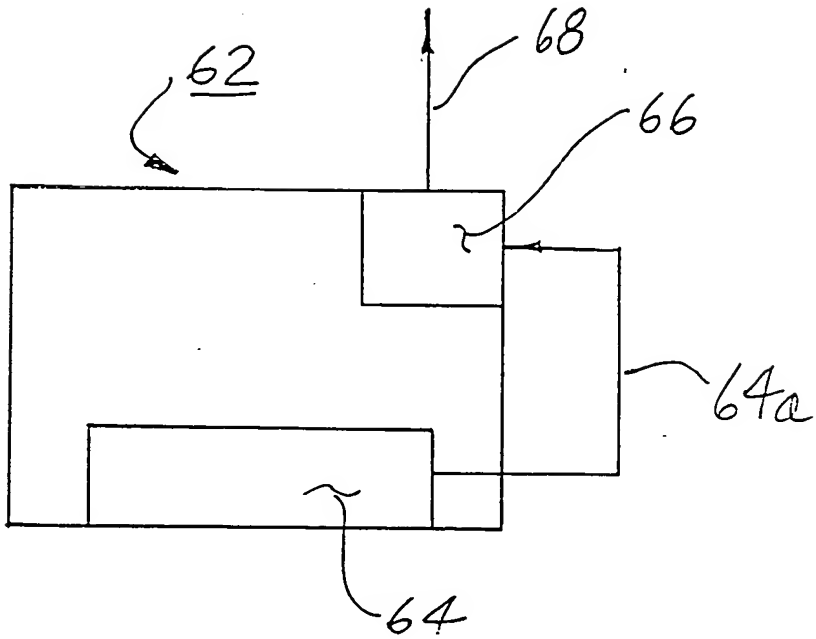


FIG 10

FIG. 11

Trefry 0 to 45 degree Tooling Program (Tool #1)

Program Inputs:

θ	Tool Block Angle =	45.000 degrees	
80	Overall Pin No 1 to Pin No 2 Height =	1.250 inches	
81	Overall Pin No 2 to Pin No 3 Width =	2.001 inches	
30	Horizontal Spacer Block No 1 =	1.250 inches	
32	Horizontal Spacer Block No 2 =	0.500 inches	
57	Manufacturing Misalignment =	0.000 inches	(offset of Pin No 3 below horizontal plane of Pin No 2)
53	Diameter of Pin No 1 =	0.375 inches (REF)	
54	Diameter of Pin No 2 =	0.375 inches (REF)	
55	Diameter of Pin No 3 =	0.500 inches (REF)	

Program Outputs:

Should Tool No 1 or Tool No 2 be used?	**Use Tool No 1**
Vice Opening Dimension =	**2.1176** inches
Vice Opening Pin Diameter =	**0.3676** inches
Vertical Clamping Blocks Dimension =	**1.0873** inches

Geometry Calculations:

Tool Angle with respect to tool base =	0.7854 radians
X1 =	0.1875 inches
X2 =	0.6187 inches
X3 =	0.1326 inches
X4 =	0.9288 inches
X5 =	0.0000 inches
X6 =	0.2500 inches
Xdimension =	2.1176 inches
Y1 =	0.0549 inches
Y2 =	0.9288 inches
Y3 =	0.3536 inches
Y4 =	0.0000 inches
Y5 =	0.2500 inches
Ydimension =	1.0873 inches

Fig. 12

Drawing ID	Formula
Angle (B) (C) (A)	B=45 degrees or (n)=C; A=90 or (n) degrees
x_1 (83)=	r_1
x_4 (84)=	$(H-r_1-r_2)\sin\theta$
x_3 (86)=	$Y_2\sin\theta$
x_4 (88)=	$(W-d_3-y_2)\cos\theta$
x_5 (92)=	$r_3(1-\tan\theta)\cos\theta$
x_6 (94)=	r_3
y_1 (96)=	$r2(1-\cos\theta)$
y_2 (87)=	$(W-d_3-r2)\sin\theta$
y_3 (90)=	$r_3/\cos\theta$
y_4 (93)=	$r_3(1-\tan\theta)\sin\theta$
y_5 (95)=	r_3
For Possible Misalignment	
x5 (92_1)=	$(r_3-(r_3-m)\tan\theta)\cos\theta$
y3 (90_1)=	$r_3-m/\cos\theta$
y4 (93_1)=	$(r3-(r2-m)\tan\theta)\sin\theta$

FIG 13a

The following table generates Outputs based on Inputs for 0 to 45 degrees:

Tool Block Angle θ	Radians	Tool No 20	Vice Opening Dimension 50 (inches)	Vice Opening Pin Diameter 56 (inches)	Vertical Clamping Blocks Dimension 59 (inches)
0.0	0.0000	Tool No 1	2.0010	0.2510	0.0000
0.5	0.0087	Tool No 1	2.0080	0.2580	0.0136
1.0	0.0175	Tool No 1	2.0149	0.2649	0.0273
1.5	0.0262	Tool No 1	2.0217	0.2717	0.0409
2.0	0.0349	Tool No 1	2.0284	0.2784	0.0545
2.5	0.0436	Tool No 1	2.0350	0.2850	0.0681
3.0	0.0524	Tool No 1	2.0414	0.2914	0.0817
3.5	0.0611	Tool No 1	2.0477	0.2977	0.0953
4.0	0.0698	Tool No 1	2.0539	0.3039	0.1089
4.5	0.0785	Tool No 1	2.0599	0.3099	0.1225
5.0	0.0873	Tool No 1	2.0659	0.3159	0.1360
5.5	0.0960	Tool No 1	2.0717	0.3217	0.1496
6.0	0.1047	Tool No 1	2.0774	0.3274	0.1631
6.5	0.1134	Tool No 1	2.0829	0.3329	0.1766
7.0	0.1222	Tool No 1	2.0884	0.3384	0.1901
7.5	0.1309	Tool No 1	2.0937	0.3437	0.2035
8.0	0.1396	Tool No 1	2.0989	0.3489	0.2170
8.5	0.1484	Tool No 1	2.1039	0.3539	0.2304
9.0	0.1571	Tool No 1	2.1089	0.3589	0.2438
9.5	0.1658	Tool No 1	2.1137	0.3637	0.2572
10.0	0.1745	Tool No 1	2.1183	0.3683	0.2705
10.5	0.1833	Tool No 1	2.1229	0.3729	0.2839
11.0	0.1920	Tool No 1	2.1273	0.3773	0.2972
11.5	0.2007	Tool No 1	2.1316	0.3816	0.3105
12.0	0.2094	Tool No 1	2.1358	0.3858	0.3237
12.5	0.2182	Tool No 1	2.1398	0.3898	0.3369
13.0	0.2269	Tool No 1	2.1437	0.3937	0.3501
13.5	0.2356	Tool No 1	2.1475	0.3975	0.3633
14.0	0.2443	Tool No 1	2.1511	0.4011	0.3764
14.5	0.2531	Tool No 1	2.1546	0.4046	0.3895
15.0	0.2618	Tool No 1	2.1580	0.4080	0.4025
15.5	0.2705	Tool No 1	2.1613	0.4113	0.4156
16.0	0.2793	Tool No 1	2.1644	0.4144	0.4285
16.5	0.2880	Tool No 1	2.1674	0.4174	0.4415

FIG. 13b

17.0	0.2967	Tool No 1	2.1702	0.4202	0.4544
17.5	0.3054	Tool No 1	2.1730	0.4230	0.4673
18.0	0.3142	Tool No 1	2.1756	0.4256	0.4801
18.5	0.3229	Tool No 1	2.1780	0.4280	0.4929
19.0	0.3316	Tool No 1	2.1803	0.4303	0.5056
19.5	0.3403	Tool No 1	2.1825	0.4325	0.5183
20.0	0.3491	Tool No 1	2.1846	0.4346	0.5310
20.5	0.3578	Tool No 1	2.1865	0.4365	0.5436
21.0	0.3665	Tool No 1	2.1883	0.4383	0.5562
21.5	0.3752	Tool No 1	2.1900	0.4400	0.5687
22.0	0.3840	Tool No 1	2.1915	0.4415	0.5811
22.5	0.3927	Tool No 1	2.1929	0.4429	0.5936
23.0	0.4014	Tool No 1	2.1942	0.4442	0.6059
23.5	0.4102	Tool No 1	2.1953	0.4453	0.6183
24.0	0.4189	Tool No 1	2.1963	0.4463	0.6305
24.5	0.4276	Tool No 1	2.1972	0.4472	0.6427
25.0	0.4363	Tool No 1	2.1979	0.4479	0.6549
25.5	0.4451	Tool No 1	2.1985	0.4485	0.6670
26.0	0.4538	Tool No 1	2.1989	0.4489	0.6791
26.5	0.4625	Tool No 1	2.1993	0.4493	0.6911
27.0	0.4712	Tool No 1	2.1995	0.4495	0.7030
27.5	0.4800	Tool No 1	2.1995	0.4495	0.7149
28.0	0.4887	Tool No 1	2.1994	0.4494	0.7267
28.5	0.4974	Tool No 1	2.1992	0.4492	0.7385
29.0	0.5061	Tool No 1	2.1989	0.4489	0.7502
29.5	0.5149	Tool No 1	2.1984	0.4484	0.7618
30.0	0.5236	Tool No 1	2.1978	0.4478	0.7734
30.5	0.5323	Tool No 1	2.1970	0.4470	0.7849
31.0	0.5411	Tool No 1	2.1961	0.4461	0.7963
31.5	0.5498	Tool No 1	2.1951	0.4451	0.8077
32.0	0.5585	Tool No 1	2.1940	0.4440	0.8190
32.5	0.5672	Tool No 1	2.1927	0.4427	0.8303
33.0	0.5760	Tool No 1	2.1913	0.4413	0.8415
33.5	0.5847	Tool No 1	2.1897	0.4397	0.8526
34.0	0.5934	Tool No 1	2.1880	0.4380	0.8636
34.5	0.6021	Tool No 1	2.1862	0.4362	0.8746
35.0	0.6109	Tool No 1	2.1843	0.4343	0.8855

FIG 13 C

35.5	0.6196	Tool No 1	2.1822	0.4322	0.8963
36.0	0.6283	Tool No 1	2.1800	0.4300	0.9071
36.5	0.6370	Tool No 1	2.1776	0.4276	0.9177
37.0	0.6458	Tool No 1	2.1751	0.4251	0.9284
37.5	0.6545	Tool No 1	2.1725	0.4225	0.9389
38.0	0.6632	Tool No 1	2.1698	0.4198	0.9493
38.5	0.6720	Tool No 1	2.1669	0.4169	0.9597
39.0	0.6807	Tool No 1	2.1639	0.4139	0.9700
39.5	0.6894	Tool No 1	2.1607	0.4107	0.9802
40.0	0.6981	Tool No 1	2.1575	0.4075	0.9904
40.5	0.7069	Tool No 1	2.1541	0.4041	1.0004
41.0	0.7156	Tool No 1	2.1505	0.4005	1.0104
41.5	0.7243	Tool No 1	2.1469	0.3969	1.0203
42.0	0.7330	Tool No 1	2.1431	0.3931	1.0301
42.5	0.7418	Tool No 1	2.1392	0.3892	1.0399
43.0	0.7505	Tool No 1	2.1351	0.3851	1.0495
43.5	0.7592	Tool No 1	2.1309	0.3809	1.0591
44.0	0.7679	Tool No 1	2.1266	0.3766	1.0686
44.5	0.7767	Tool No 1	2.1222	0.3722	1.0779
45.0	0.7854	Tool No 1	2.1176	0.3676	1.0873

FIG 14